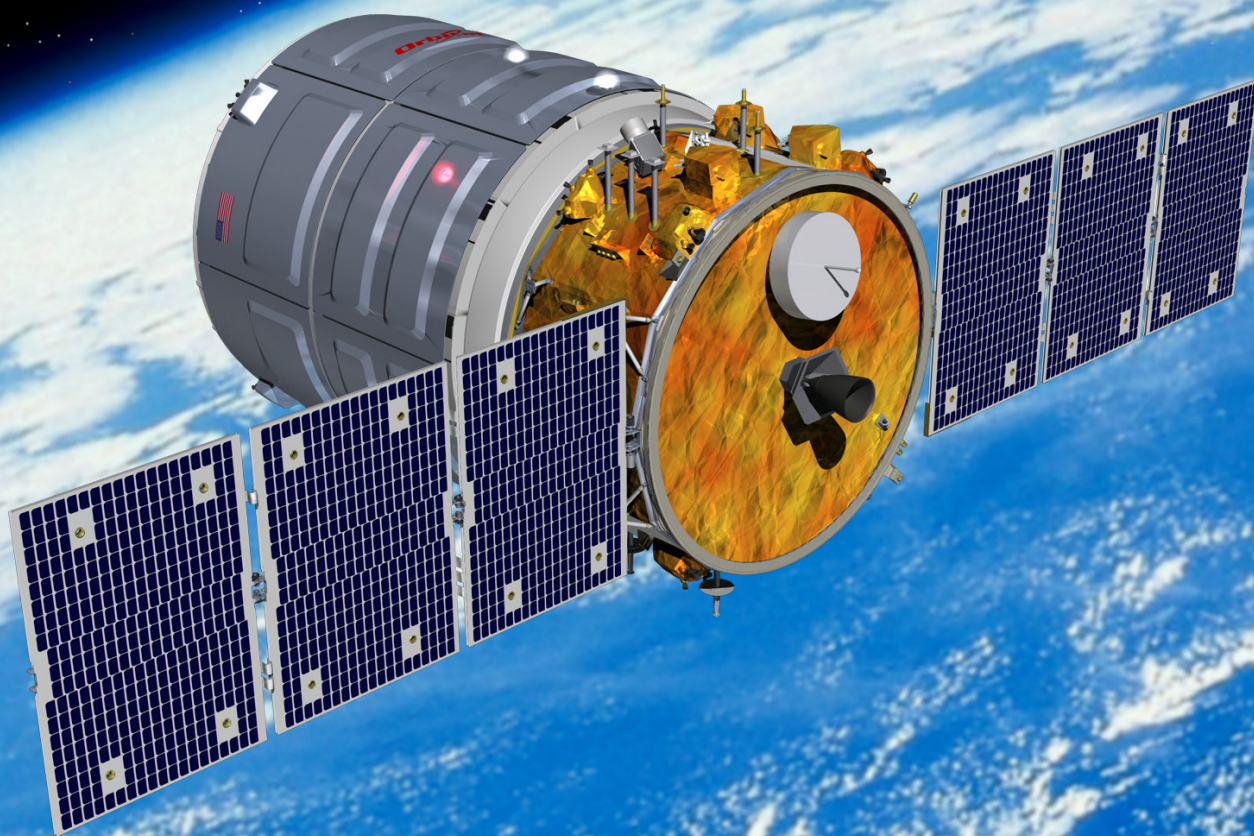




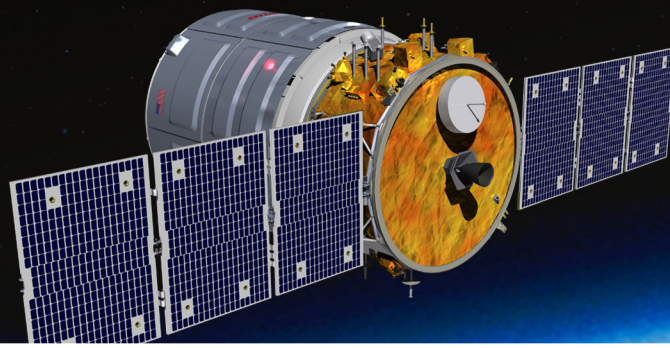
COTS/CRS

Commercial Resupply Services for the ISS

INNOVATION YOU CAN COUNT ON



COTS/CRS



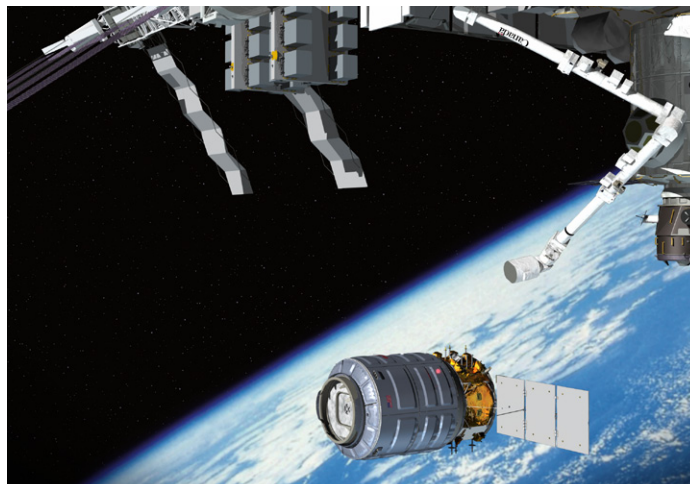
INTRODUCTION & SYSTEM OVERVIEW

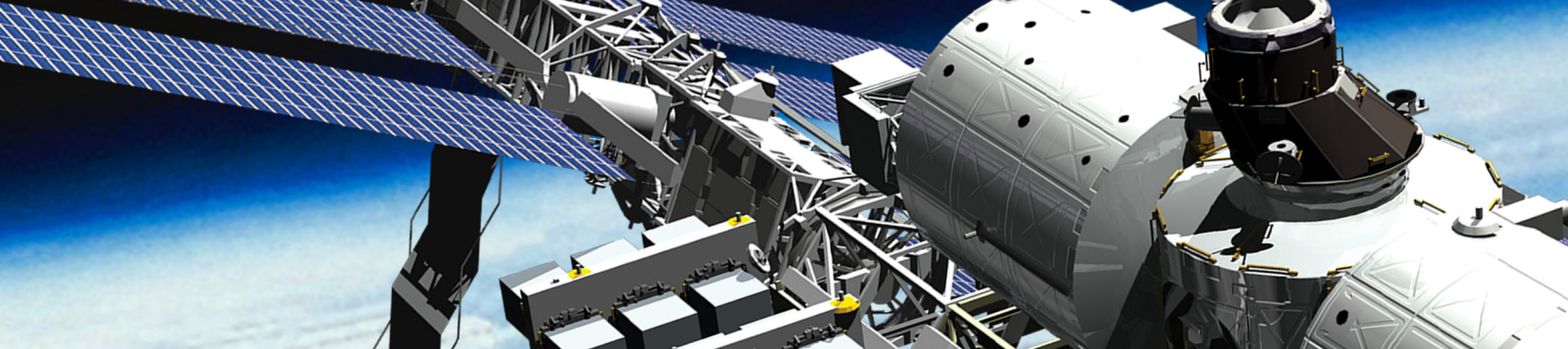
Under a Commercial Orbital Transportation Services (COTS) cooperative agreement, Orbital and NASA are jointly developing a new space transportation system to demonstrate the capability to provide cargo delivery services to the International Space Station (ISS). The COTS program will involve full-scale development and a 2011 flight demonstration of a commercial cargo delivery system, and consists of two elements:

- The Taurus® II medium-class space launch vehicle
- The Cygnus™ advanced maneuvering spacecraft, which includes a pressurized cargo module developed by Orbital's industrial partner Thales Alenia Space

With the award of the Commercial Resupply Service (CRS) contract, NASA selected Orbital to provide eight pressurized cargo missions beginning in the latter half of 2011 and running through 2015. For NASA, CRS will provide a U.S.-produced and-operated automated cargo delivery service for ISS logistic support, to complement Russian, European and Japanese ISS cargo vehicles.

Much of the development of the Orbital COTS/CRS system is internally funded. Industrial partners include some of the world's leading space companies providing heritage subsystems with flight-proven heritage to ensure high reliability. To support the COTS/CRS missions, new ground support and launch facilities are being built at NASA's Wallops Flight Facility, Virginia.



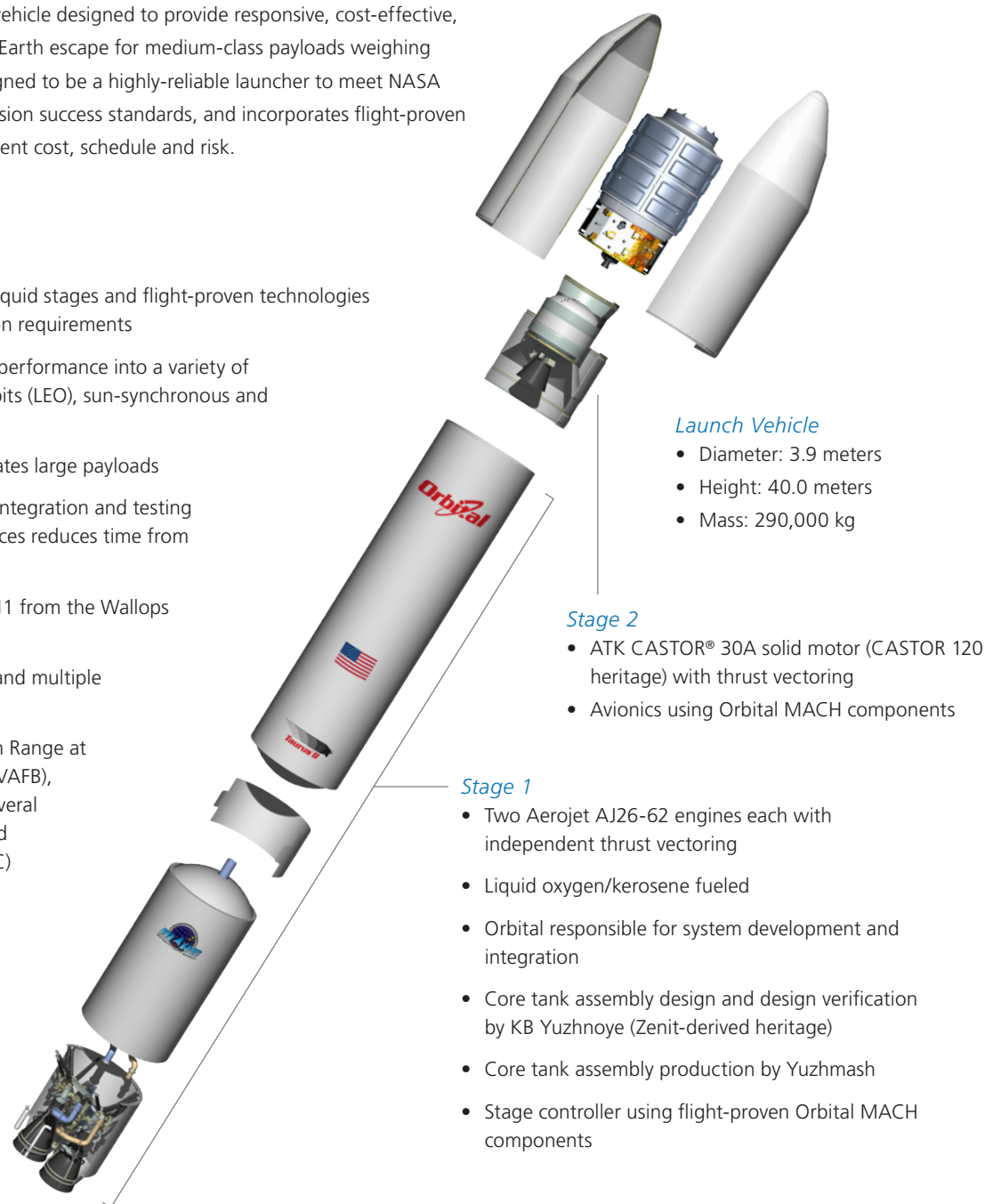


TAURUS II SPACE LAUNCH VEHICLE

Taurus II is a two-stage launch vehicle designed to provide responsive, cost-effective, and reliable access to orbit and Earth escape for medium-class payloads weighing up to 7,000 kg. Taurus II is designed to be a highly-reliable launcher to meet NASA Category 3 and similar DoD mission success standards, and incorporates flight-proven subsystems to reduce development cost, schedule and risk.

SYSTEM FEATURES

- Incorporates both solid and liquid stages and flight-proven technologies to meet medium-class mission requirements
- Provides substantial payload performance into a variety of low inclination low-Earth orbits (LEO), sun-synchronous and interplanetary orbits
- 3.9 meter fairing accommodates large payloads
- Streamlined vehicle/payload integration and testing via simplified avionics interfaces reduces time from encapsulation to lift-off
- Initial launch capability in 2011 from the Wallops Flight Facility (WFF)
- Capable of launching single and multiple payloads
- Compatible with the Western Range at Vandenberg Air Force Base (VAFB), Eastern Range at Cape Canaveral Air Force Station (CCAFS) and Kodiak Launch Complex (KLC)





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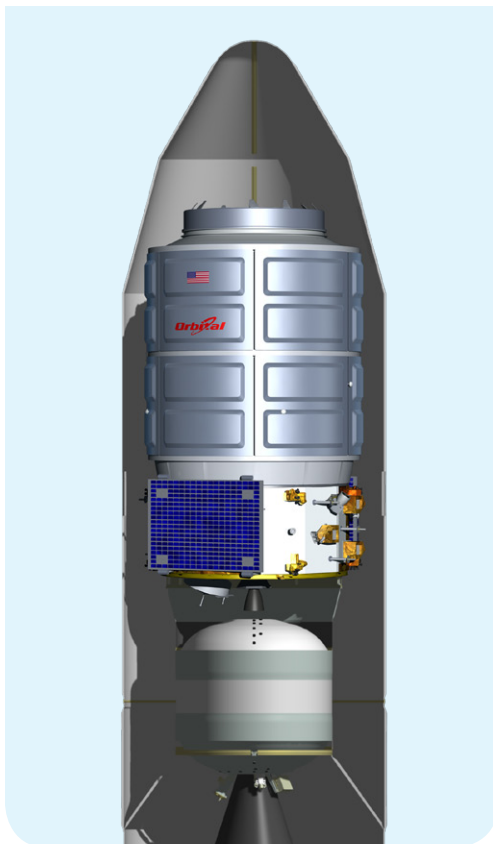
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Multi-Purpose Logistics Module (MPLM)



CYGNUS ADVANCED MANEUVERING SPACECRAFT

The Cygnus advanced maneuvering spacecraft is a low-risk design incorporating elements drawn from Orbital and its partners' existing, flight-proven spacecraft technologies. Cygnus consists of a common service module and a pressurized cargo module. The service module incorporates avionics, propulsion and power systems from Orbital's flight-proven STAR™ and LEOStar™ satellite lines.

The pressurized cargo module is based on the Multi-Purpose Logistics Module (MPLM), developed by Thales Alenia Space for NASA. The module will carry crew supplies, spares and scientific experiments.

Service Module (SM)

- Design, integration and test performed by Orbital
- Heritage: STAR Bus, LEOStar
- Gross Mass: 1,800 kg
- Power Generation: 2 fixed wing solar arrays, ZTJ Gallium Arsenide cells
- Power Output: 3.5 kW (sun-pointed)
- Propellant: Dual-mode N_2H_4 /MON-3 or N_2H_4

Pressurized Cargo Module (PCM)

- Design, integration and test performed by Thales Alenia Space
- Heritage: Multi-Purpose Logistics Module
- Gross Mass: 3,500 kg
- Total Cargo Mass: 2,000 kg (standard), 2,700 kg (enhanced)
- Pressurized Volume: 18.9 m³/26.2 m³
- Berthing at ISS: Node 2 Common Berthing Mechanism (CBM)

